PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY
(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference	FOR FURTHER ACTION See Form PCT/IPEA/416	
P0133PC		
International application No.	International filing date *(day/month/year)*	Priority date *(day/month/year)*
PCT/SE 2002/000207	07-02-2002	----
International Patent Classification (IPC) or national classification and IPC		
H05B 43/00		
Applicant		
FILLIPPINI, Daniel et al.		

1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.
2. This REPORT consists of a total of 4 sheets, including this cover sheet.
3. This report is also accompanied by ANNEXES, comprising:

   a. ☒ *(sent to the applicant and to the International Bureau)* a total of 3 sheets, as follows:

   ☒ sheets of the description, claims and/or drawings which have been amended and are the basis of this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).

   ☐ sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.

   b. ☐ *(sent to the International Bureau only)* a total of (indicate type and number of electronic carrier(s))

   _____, containing a sequence listing and/or tables related thereto, in computer readable form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).

4. This report contains indications relating to the following items:

☒	Box No. I	Basis of the report
☐	Box No. II	Priority
☐	Box No. III	Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
☐	Box No. IV	Lack of unity of invention
☒	Box No. V	Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
☐	Box No. VI	Certain documents cited
☐	Box No. VII	Certain defects in the international application
☐	Box No. VIII	Certain observations on the international application

Date of submission of the demand	Date of completion of this report
04-09-2003	28-05-2004
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Form PCT/IPEA/409 (cover sheet) (January 2004)

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.
PCT/SE 2002/000207

Box No. I Basis of the report

1. With regard to the **language**, this report is based on the international application in the language in which it was filed, unless otherwise indicated under this item.

☐ This report is based on a translation from the original language into the following language _____, which is the language of a translation furnished for the purposes of:

☐ international search (under Rules 12.3 and 23.1(b))
☐ publication of the international application (under Rule 12.4)
☐ international preliminary examination (under Rules 55.2 and/or 55.3)

2. With regard to the **elements** of the international application, this report is based on *(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report):*

☐ the international application as originally filed/furnished

☒ the description:

pages 1-14 as originally filed/furnished
pages* _____ received by this Authority on _____
pages* _____ received by this Authority on _____

☒ the claims:

pages _____ as originally filed/furnished
pages* _____ as amended (together with any statement) under Article 19
pages* 1-3 received by this Authority on 2004-02-02
pages* _____ received by this Authority on _____

☒ the drawings:

pages 1-10 as originally filed/furnished
pages* _____ received by this Authority on _____
pages* _____ received by this Authority on _____

☐ a sequence listing and/or any related table(s) – see Supplemental Box Relating to Sequence Listing.

3. ☐ The amendments have resulted in the cancellation of:

☐ the description, pages _____
☐ the claims, Nos. _____
☐ the drawings, sheets/figs _____
☐ the sequence listing *(specify)*: _____
☐ any table(s) related to the sequence listing *(specify)*: _____

4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).

☐ the description, pages _____
☐ the claims, Nos. _____
☐ the drawings, sheets/figs _____
☐ the sequence listing *(specify)*: _____
☐ any table(s) related to the sequence listing *(specify)*: _____

* *If item 4 applies, some or all of those sheets may be marked "superseded."*

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.
PCT/SE 2002/000207

Box No. V **Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

1. Statement

Novelty (N)	Claims	1-29	YES
	Claims		NO
Inventive step (IS)	Claims	1-29	YES
	Claims		NO
Industrial applicability (IA)	Claims	1-29	YES
	Claims		NO

2. Citations and explanations (Rule 70.7)

This report is based on the claims received with the response to the written opinion on 15-03-2004.

Reference is made to the following documents:
D1: US 5372502 A
D2: US 5386112 A
D3: US 5418614 A

Document D1 describes an optical probe and a method for a three-dimensional survey of teeth. The measuring probe includes a programmable projecting unit, an image storing device, and an image computer having a microprocessor for the pixel-wise control of the projection unit (see column 3, lines 25-41). The light source is a LCD (Liquid Crystal Display) matrix plate which can be a colour LCD (see column 4, line 67 - column 5, line 13).

Document D2 describes a method for assessing diamond quality by irradiating a diamond with a laser and detecting the scattered light with a detector. In the light path there are some optics and a monochromator (see abstract and fig. 1).

Document D3 describes an optical photometry system for on-line analysis of fluid systems.

The method for surveying of teeth described in document D1 is considered to represent the closest prior art. The invention as defined in claims 1-29 differs from what is known from D1 in that the method is applicable in chemical or biochemical analysis of a target analyte in a target environment and that a test sample in or in contact with said target environment is chemically or biologically modified changing its spectral response.
../..

Supplemental Box

In case **the space in any of the preceding boxes is not sufficient.**
Continuation of: box V

Accordingly, the invention defined in claims 1-29 is novel and is considered to involve an inventive step. The invention is industrially applicable.

1. A method for chemical or biochemical analysis of a target analyte in a target environment, **characterized in, that** the method comprises the steps of:

   - providing a test sample in or in contact with said target environment, which test sample upon interaction with said target analyte is chemically or biologically modified changing its spectral response;
   - illuminating said test sample using a program controlled display as a light source, which program controlled display is composed of at least one activated pixel providing the illumination from an illuminating area of said program controlled display;
   - detecting light emerging from said test sample by a detector coupled to said program controlled display, and
   - displaying test results originating from signals from said detector on said program controlled display.

2. A method according to claim 1, **characterized in, that** the step of providing a test sample comprises providing the test sample in the target environment.

3. A method according to claim 1, **characterized in, that** the step of providing a test sample comprises providing the test sample on said detector, whereby the electrical properties of said detector upon chemical or biochemical interaction with said target analyte is affected.

4. A method according to any of the preceding claims, **characterized in, that** the step of displaying signals comprises displaying resulting spectra.

5. A method according to claim 3, **characterized in, that** the step of displaying signals comprises displaying a chemical or biochemical image using a photocurrent colour coded scale.

6. A method according to any of the preceding claims, **characterized in, that** the method further comprises individually modulating the colour of each individual pixel by software.

7. A method according to any of the preceding claims, **characterized in, that** the method further comprises individually modulating the light intensity of each individual pixel by software.

8. A method according to any of the preceding claims, **characterized in, that** the method further comprises scanning the colour of each individual pixel within the visible range by software.

9. A method according to any of the preceding claims, **characterized in, that** the colour, size, shape, modulation and background colour of said illuminating area is configured through a user interface.

10. A method according to any of the preceding claims, **characterized in, that** the method further comprises displacing said illuminating area of said program controlled display over time.

11. A method according to any of the preceding claims, **characterized in, that** the step of displaying further comprises displaying said test results on a part of said program controlled display that is not used for illumination.

12. A method according to any of the preceding claims, **characterized in, that** the method further comprises placing a diffractive element between said program controlled display and said test sample.

13. A method according to claim 12, **characterized in, that** the method further comprises placing a collimating slit between said diffractive element and said test sample and scanning diffracted light through the collimated slit by displacement of said illuminating area.

14. A method according to any of the preceding claims, **characterized in, that** the method further comprises a step of evaluating said signals from said detector by software coupled to said program controlled display.

15. A method according to any of the preceding claims, **characterized in, that** the method further comprises a step of evaluating said signals from said detector through an on-line analysis by an expert or an expert system.

16. A method according to any of the preceding claims, **characterized in, that** the method further comprises controlling said program controlled display, said detector, said electronic device and said user interface by a computer.

17. A system for chemical or biochemical analysis of a target analyte in a target environment, **characterized in, that** said system comprises:

- a test sample, which upon interaction with said target analyte is arranged to be chemically or biologically modified to change its spectral response;
- a program controlled display arranged to be used as a light source for illumination of said test sample and to be used for displaying test results, and
- a detector arranged to detect light emerging from said test sample and coupled to said program controlled display.

18. A system according to claim 17, **characterized in, that** said program controlled display is a cathode ray tube computer monitor or a liquid crystal display monitor.

19. A system according to claim 17 or 18, **characterized in, that** said test sample comprises molecules or materials specifically designed to show spectral changes upon chemical or biochemical reactions.

20. A system according to any of claims 17-19, **characterized in, that** said test sample comprises molecules or materials specifically designed to be used together with rgb-illumination.

21. A system according to any of claims 17-20, **characterized in, that** said test sample is an indicator deposited as a layer on a transparent substrate, in a cuvette or in a cavity of an analysis plate.

22. A system according to any of claims 17-20, **characterized in, that** said test sample is a detector gate.

23. A system according to any of claims 17-21, **characterized in, that** said detector is a web camera, a digital camera or a video camera.

24. A system according to any of claims 17-20 or 22, **characterized in, that** said detector is a semiconductor device, a conductive photo-sensitive detector, a polymer photo-detector or an ion-sensitive device.

25. A system according to any of claims 17-21 or 23, **characterized in, that** the system further comprises a holder for holding said test sample at a distance from said program controlled display.

26. A system according to any of claims 17-21 or 23 or 25, **characterized in, that** system further comprises a magnifying lens between said test sample and said detector.

27. A system according to any of the preceding claims, **characterized in, that** the system further comprises a diffractive element arranged to be placed between said program controlled display and said test sample.

28. A system according to claim 27, **characterized in, that** the system further comprises a collimating slit arranged to be placed between said diffractive element and said test sample.

29. A system according to any of the preceding claims, **characterized in, that** the system further comprises a focussing lens between said program controlled display and said test sample.